State of Utah
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

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March 3, 1998

TO: File

THRU: Daron Haddock, Permit Supervisor

FROM: David Darby, Senior Reclamation Specialist

RE: Water Users' Concern Regarding Spring Flow Interception of Little Bear Spring by the Crandall Canyon Mine, ACT/015/032, Genwal Resources, INC., Folder #2, Emery County, Utah

SYNOPSIS

Vernell Rowley, a Huntington resident and water user, contacted the Division to inquire about the validity of reports he had heard from other local residents that the Crandall Canyon Mine had mined into a finger of the Joes Valley Fault and was producing large amounts of water. He expressed a concern that the large discharges might deplete the recharge flows to Little Bear Spring.

ANALYSIS

I contacted Mr. Rowley by telephone on January 16, 1998 to identify his concerns so that they could be evaluated and addressed. I also contacted Gary Gray on January 16, 1998 to discuss current mining conditions and to pass along Mr. Rowley's concern that the flow at Little Bear Spring was not being protected. I reviewed the mine maps to determine the location of mining with respect to the location of Little Bear Spring and any potential relationship between the two. I compiled data of mine water discharge flows in order to establish discharge trends.

Mine Water Discharge Trend

The Crandall Canyon Mine started producing water in significant volumes in 1996 when longwall operations moved into Sections 26 and 35 (Figure 1). The intercepted water was of good quality, but the large volumes had to be discharged because the water could not be stored

underground. Longwall mining typically produces more water, because the roof is allowed to drop and fracturing of the overburden opens areas where groundwater is stored. Higher volumes of stored groundwater are expected while mining next to the Joes Valley Fault, because the area adjacent to the fault would characteristically be more fractured and store

Physical Setting

Gary Gray stated that longwall mining is taking place in the 4th West Panel, which is in the S1/2 of the N1/4 Section 35. The panel is approximately 820 feet wide and is progressing from west to east. In a telephone conversation on February 11, 1998, Gary stated that operations had only contacted a large fracture of the Joes Valley Fault when the Main West entries were developed in 1995. A sympathetic fault was contacted as the gate entry for the 7th North panel was developed.

Current mining activities are taking place at an elevation of 8550 feet, whereas the mine portals are at the 8000 feet elevation, and Joes Valley, adjacent to Section 35, ranges between 9200 to 9400 feet in elevation. The coal seam dips to the southeast as shown in Plate 6-7, Crandall Canyon Mine Mining and Reclamation Plan. Little Bear Spring flows from the Star Point Sandstone at an elevation approximately 7600 feet.

Little Bear Spring is located about 4.9 miles to the southeast of current mining activity. The piezometric surface of the groundwater in the Spring Canyon Member of the Star Point Sandstone (Figure 2) appears to dip to the southeast similar to the dip slope of the formations. The Potentiometric surface ranges approximately 8150 feet where current mining activity is taking place and an estimated 7600 feet at Little Bear Spring.

There are no major faults between the Genwal's current mining operations and the area around Little Bear Spring (Figure 3). However, several faults associated with the Pleasant Valley/Bear Canyon Fault system dissect the area surrounding Little Bear Spring. These faults trend north-south in direction.

Recharge Source of Little Bear Spring

There are a few theories characterizing the recharge sources of Little Bear Spring. All or any part of the flow which emanates from the spring could come from either up dip sources or fault related flows. The irregular terrain and the geologic characteristics of formations above the Star Point Sandstone hinder vertical movement of groundwater to the spring.

The Blackhawk Formation contains interbedded layers of clays, shells and coal beds which impede vertical flows. These layers tend to trap groundwater until it moves horizontally, which accounts for the high number of springs above the coal mine seam. Figure 4 identifies most of the springs in the vicinity of the lease areas. Most of the precipitation that falls on the

mountain end up as surface discharge. Small amounts of vertical groundwater seepage could reach the Star Point Sandstone and Little Bear Spring over time.

The fault system is another source which could supply the spring if it has the capacity to transmit flows along a gouge zone.

A third theory, which is most controversial between water users and the Crandall Canyon Mine is the potential that recharge comes from areas along the Joes Valley Fault system and that mining will intercept groundwater, then discharge it to Crandall Canyon Creek/Huntington Creek preventing it from reaching Little Bear Spring.

FINDINGS AND RECOMMENDATIONS

The available information does not indicate that Little Bear Spring is being impacted by current mining operations. The Crandall Canyon Mine has constantly increased discharges since 1995, while recently Little Bear Spring has increased in flow (Figure 5 and 6). It is clear that the recharge sources need to be understood especially if new areas are mined to the south.

It is recommended that further hydrological and subsidence studies be conducted to assess any impacts from mining, and that joint participation between the Water Users, Genwal Mining Company, the US Forest Service, US Bureau of Land Management and the Utah Division of Oil Gas and Mining be promoted in order to insure resource conservation.

Plans should be developed to assure that all pertinent sites, hydrologic resources and subsidence areas are monitored, and that all associate parties have access to the data as well as the capabilities of verifying the data.

cc: Mary Ann Wright, DOGM
Joe Helfrich , DOGM

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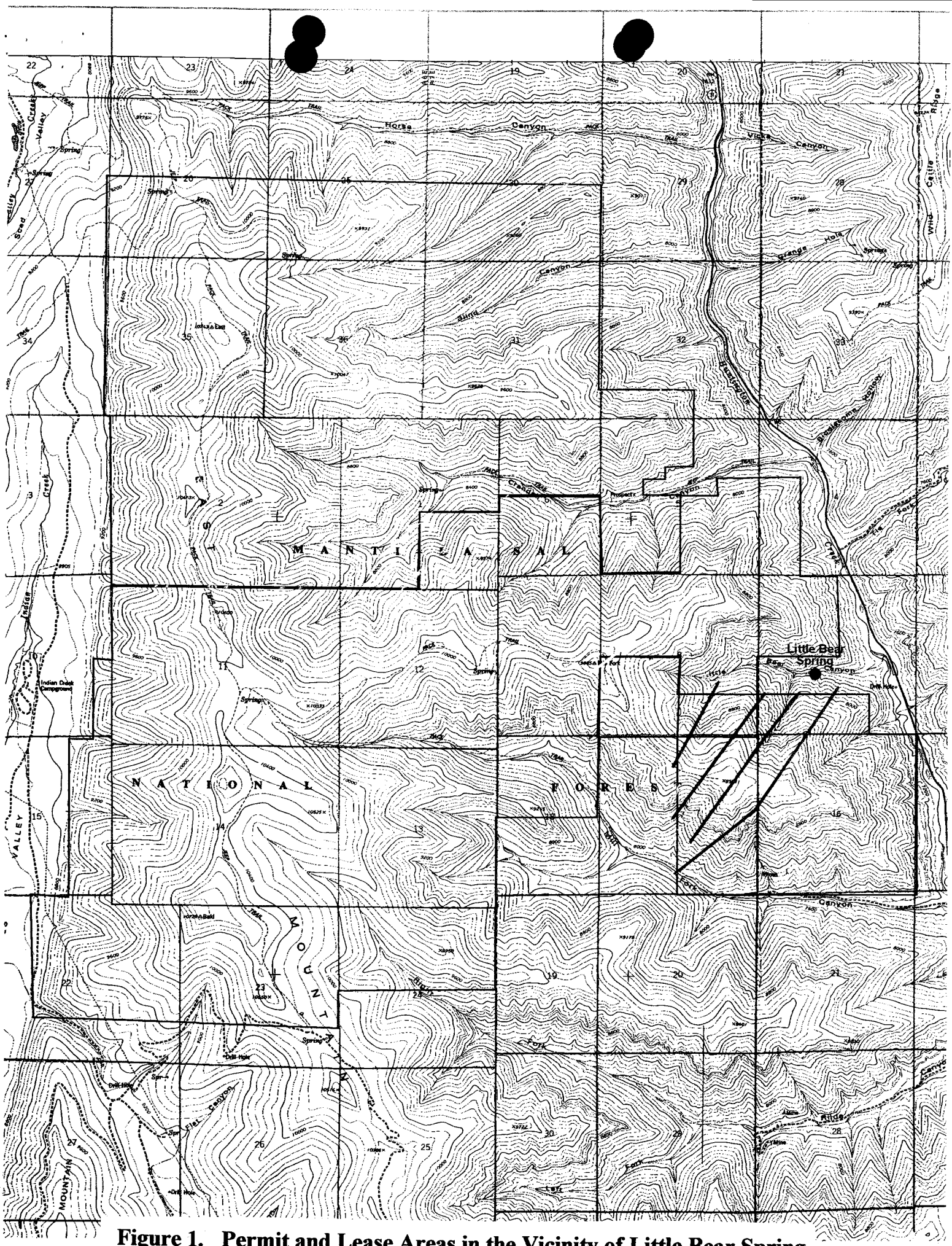

Figure 1. Permit and Lease Areas in the Vicinity of Little Bear Spring

Faults mapped adjacent to Little Bear Spring

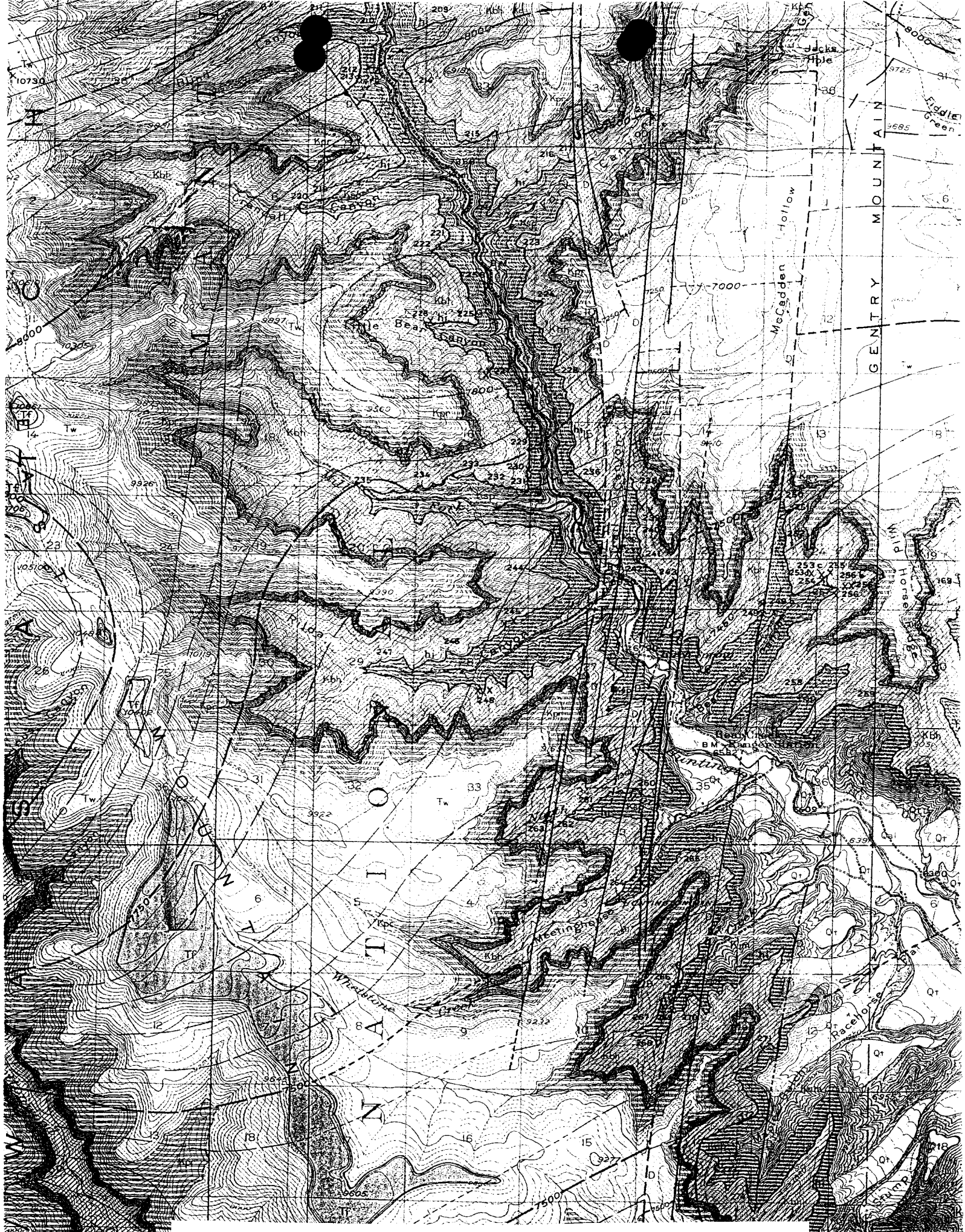

Figure 2. Structure Contour Map of the Star Point Sandstone

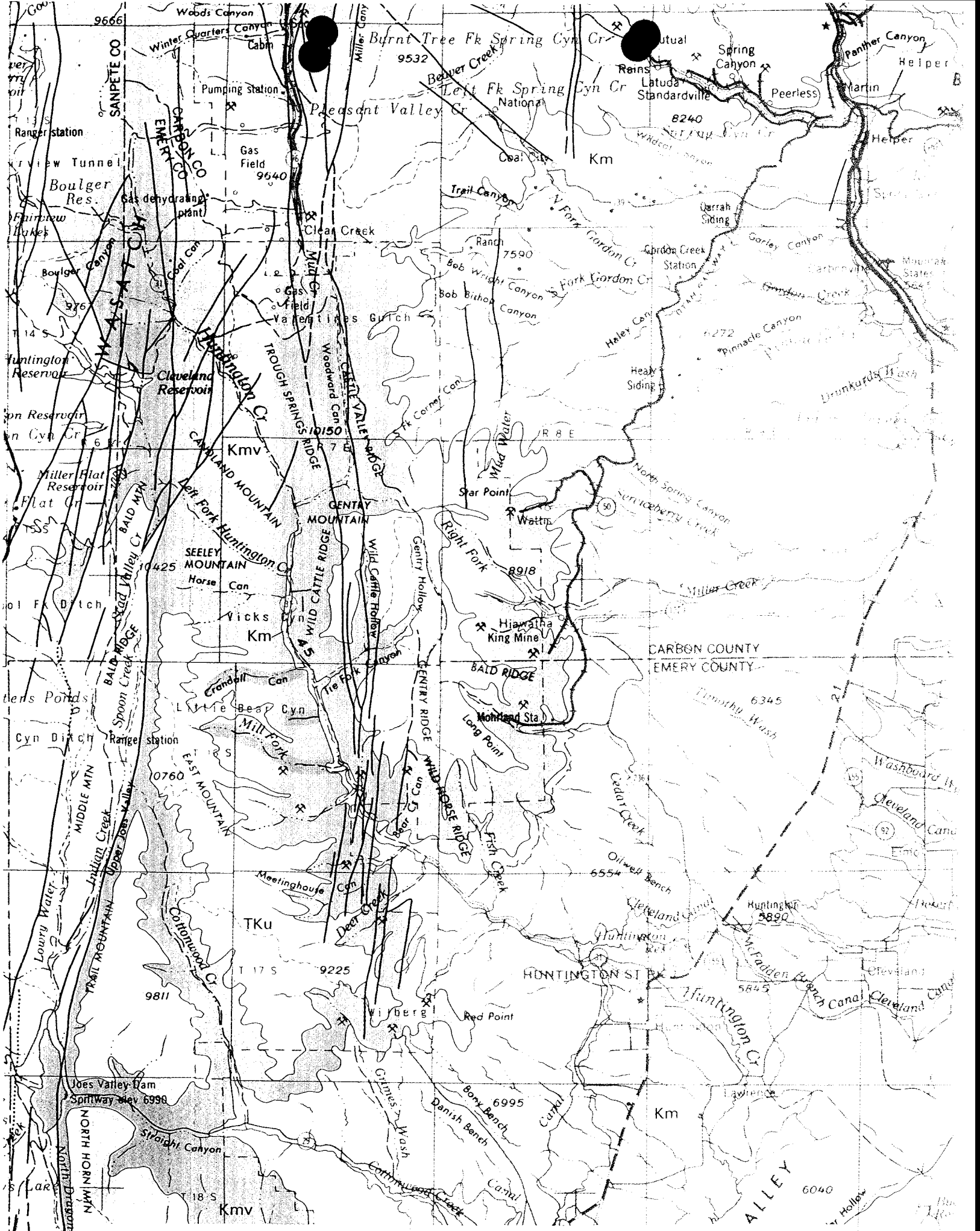

Figure 3. Fault Systems in the Vicinity of East Mountain and Gentry Ridge

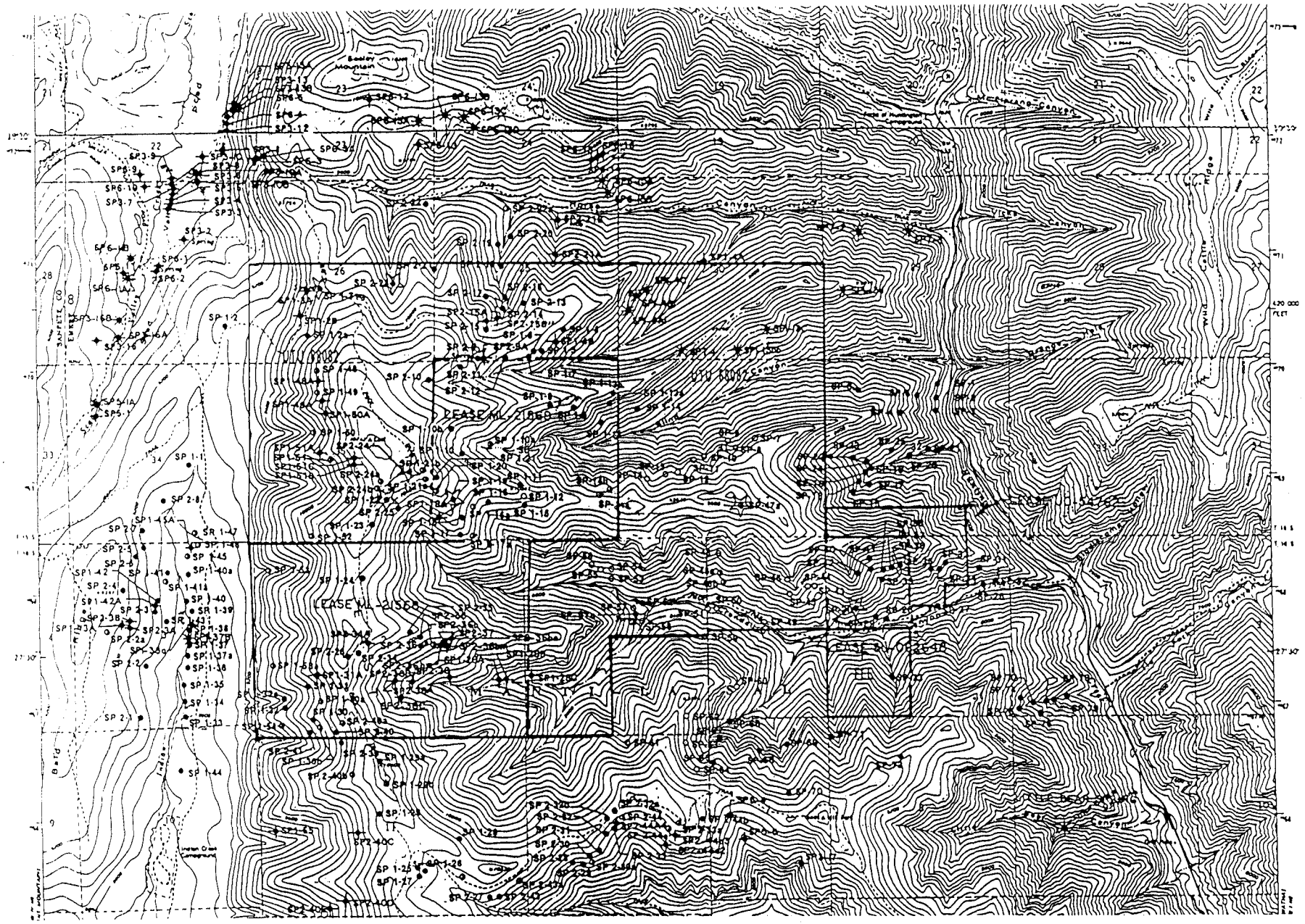

Figure 4. Seep and Spring Location above Little Bear Canyon

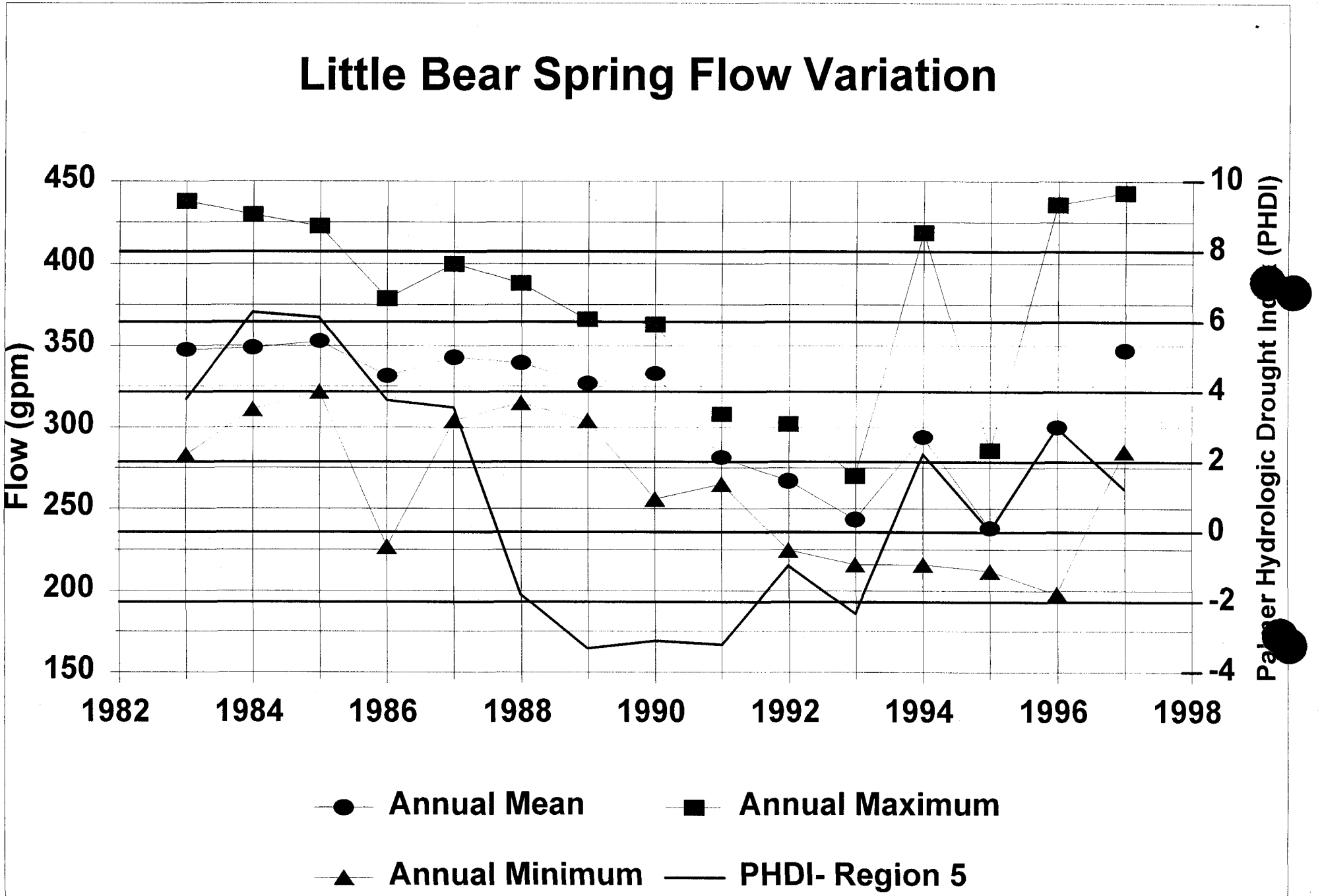

Figure 5. Annual Mean, Minimum and Maximum Flows from Little Bear Spring, Compared to the Palmer Drought Index

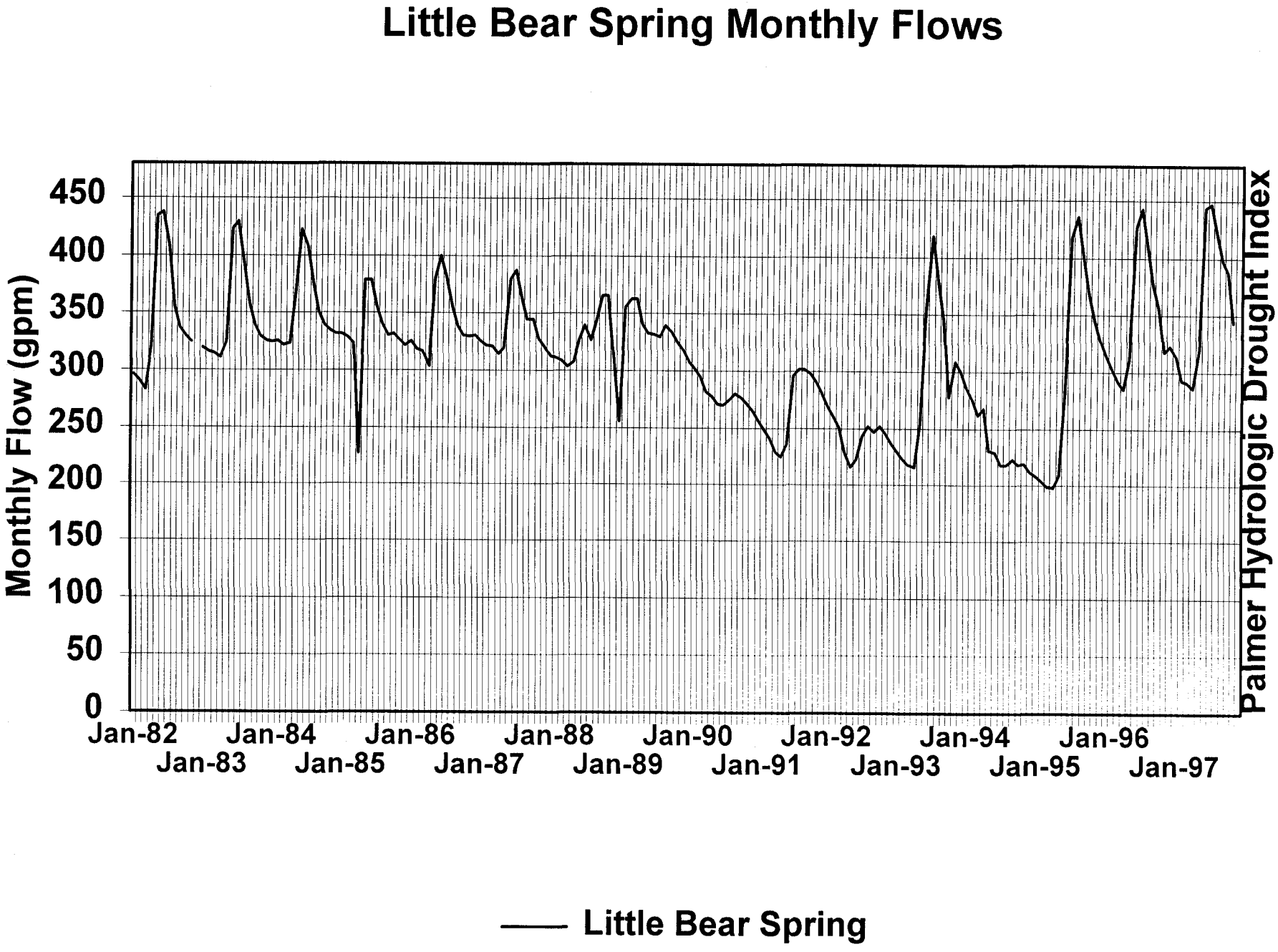

Figure 6. Monthly Flows from Little Bear Spring